1. Introduction

Failure to recognize potentially incapacitating medical conditions can have serious safety consequences for railroad employees, the railroads and the public. Conditions, such as seizure disorders, cardiovascular disease and sleep disorders, as well as some prescription and over-the-counter medications, may put the employee at risk of being unable to perform his or her safety-sensitive function. Several modes of transportation in the U.S., in particular motor carrier, aviation and maritime, have regulations and a government-mandated process in place to minimize the risk of an employee performing a job in the presence of a medical condition or medication that has the risk of compromising the employee's ability to safely carry out the requirements of the job. Prompted by a fatal accident involving two Canadian National/Illinois Central trains, the Federal Railroad Administration (FRA) is now examining the need to adopt more rigorous medical standards in the railroad industry. This report provides information for the FRA to use in assessing this need and determining an appropriate course of action for the railroad industry.

1.1 Background

The FRA has many safety regulations governing the safety of both passenger and freight railroad operations. However, with the exception of vision and hearing standards for locomotive engineers, these regulations do not address the medical condition of the employee. In contrast to other modes of transportation, these medical standards are limited in scope and apply to only one group of safety-sensitive employees.

In November 2001 two Canadian National/Illinois Central Railway trains collided near Clarkston, Michigan. One of the trains approaching the mainline from a siding did not stop before proceeding onto the mainline track and collided with the oncoming train on the mainline. The National Transportation Safety Board (NTSB) investigation found the probable cause of this accident to be the fatigue of the crewmembers on the train that approached from the siding. Further, this fatigue was primarily due to the engineer's untreated and the conductor's insufficiently treated obstructive sleep apnea. (Sleep apnea is a sleep disorder involving cessation of breathing and disrupted sleep. The lack of continuous nighttime sleep may lead to excessive daytime sleepiness.) As a result of its investigation of this accident, the NTSB made the following recommendations to the FRA:[4]

- Develop a standard medical examination form that includes questions regarding sleep problems and require that the form be used, pursuant to 49 *Code of Federal Regulations* Part 240, to determine the medical fitness of locomotive engineers; the form should also be available for use to determine the medical fitness of other employees in safety-sensitive positions.

[4] *Railroad Accident Report: Collision of Two Canadian National/Illinois Central Railway Trains Near Clarkston, Michigan, November 15, 2001*. (NTSB Report No. NTSB/RAR-02/04). Washington, DC: National Transportation Safety Board.

- Require that any medical condition that could incapacitate, or seriously impair the performance of, an employee in a safety-sensitive position be reported to the railroad in a timely manner.
- Require that, when a railroad becomes aware that an employee in a safety-sensitive position has a potentially incapacitating or performance-impairing medical condition, the railroad prohibit that employee from performing any safety-sensitive duties until the railroad's designated physician determines that the employee can continue to work safely in a safety-sensitive position.

There have been other instances in which the NTSB investigation of a railroad accident led to recommendations regarding medical standards for railroad workers in safety-sensitive positions. (See Appendix A for summary of relevant NTSB decisions.) Recommendations related to an accident in 1988 were for periodic medical examinations and development of a federal medical certificate for railroad workers similar to programs of the Federal Aviation Administration (FAA) and Federal Highway Administration (FHWA), now the Federal Motor Carrier Safety Administration (FMCSA). A 1991 NTSB recommendation focused on the content of fatigue education awareness programs.

NTSB recommendations resulting from accident investigations have also focused on medication use. All of the U.S. Department of Transportation (DOT) modal administrations have been advised to develop procedures for educating employees on the effect of medications on alertness and human performance and for assuring that employees in safety-sensitive positions report the use of relevant medications and do not work if their capabilities are compromised by medication.

In addition to the NTSB's recommendations with regard to a medical standards program for railroad workers, the demographics of the U.S. railroad workforce justify the need for such a program. Over 60 percent of U.S. railroad workers are between the ages of 45 and 64. (See Figure 1.) Available epidemiological data indicates that individuals in this age group are susceptible to developing heart disease, hypertension and diabetes.

Figure 2 contains data from the U.S. Centers for Disease Control on the prevalence of selected chronic medical conditions by age group for U.S. males. Since over 90 percent of the U.S. railroad worker population is male, these data indicate a substantial risk for the prevalence of these conditions in the railroad worker population. Heart disease, hypertension and diabetes, especially if undiagnosed or untreated, increase the risk of sudden incapacitation.

An adult population is also susceptible to sleep disorders. The National Sleep Foundation estimates that 4 percent of middle-aged men and 2 percent of middle-aged women experience excessive daytime sleepiness resulting from sleep apnea. The prevalence of sleep apnea as well as other sleep disorders increases with age. Overweight individuals have a higher risk of developing this condition. An individual with untreated sleep apnea may experience learning and memory difficulties, and more seriously, is at greater risk of falling asleep while operating a vehicle. This was the case in the Clarkston, MI accident described above. Other sleep disorders, such as narcolepsy and periodic limb movement, also lead to excessive daytime sleepiness and have the same potential consequences and risks.

Medical standards programs for transportation employees typically apply to positions with safety-sensitive functions. These are jobs in which the actions of the employee can affect the safety of other employees and the public as well as the integrity of the vehicle and other

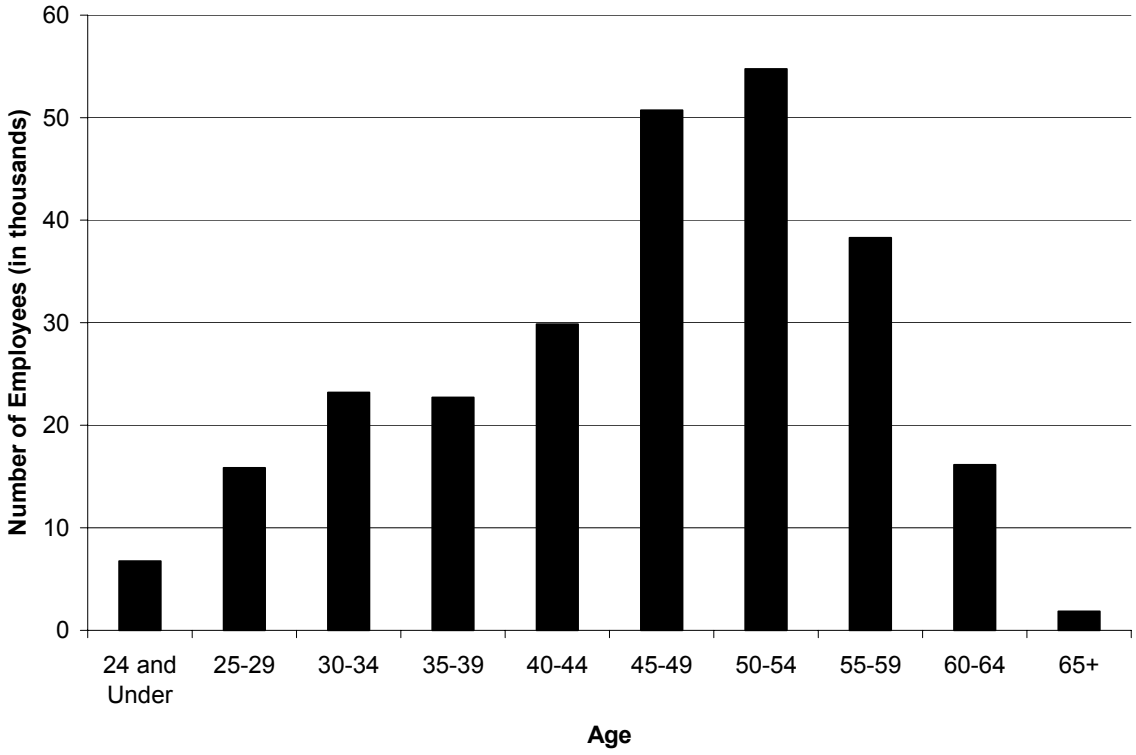

Figure 1. Distribution of U.S. railroad workers by age, 2002

Source: U.S. Railroad Retirement Board. Statistical Tables: Data through Fiscal Year 2003, Table D10 – Employees in 2002, by amount of creditable compensation or sex and by age. Retrieved June 15, 2004 from http://www.rrb.gov/act/pdf/ST03partd.pdf.

property. One subset of positions with safety-sensitive functions is that group covered by the Hours of Service Law. Typically, these positions are locomotive engineers, conductors, trainmen, signalmen and dispatchers. The Railroad Retirement Board reports total U.S. railroad employment for 2003 was 222,500.[5] According to the Association of American Railroads, employment for Class 1 railroads during this period averaged 154,656 with 70,825 employees or 46 percent in positions covered by the Hours of Service Law. Assuming that there is the same proportion of all U.S. railroad employees in Hours of Service positions and that a medical standards program would apply to these employees, then at least 101,894 employees would be required to meet medical standards.

[5] U.S. Railroad Retirement Board. *Active Employees and Railroad Retirement Act Beneficiaries by State, Calendar Year 2003*. May 2004. Retrieved June 15, 2004 from http://www.rrb.gov/act/statsindex.html.

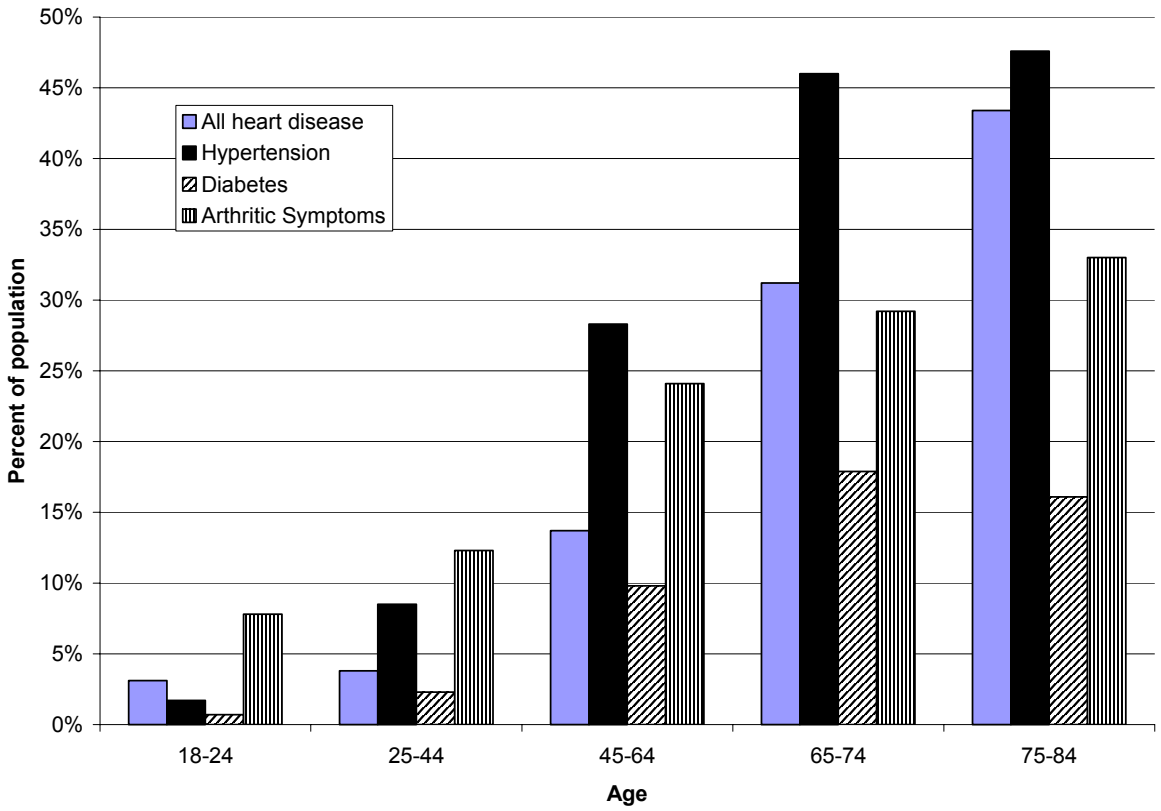

Figure 2. Prevalence of selected chronic conditions by age: U.S. males, 2000-2001

Data Source: National Center for Health Statistics. (2004). Prevalence of Selected Chronic Conditions by Age, Sex, Race, and Hispanic Origin: United States, 1997-2001. NHIS (NHIC01c). Retrieved August 17, 2004, from http://209.217.72.34/aging/TableViewer/tableView.aspx?ReportId=144.

1.2 Objectives

The objectives of the work described in this report were to:

- Assemble information to assess the need for medical standards in the U.S. railroad industry.
- Formulate options for a medical standards program.
- Make recommendations on the feasibility and need for a medical standards program for the U.S. railroad industry.

1.3 Overall approach

The work described in this report had three phases: 1) information gathering, 2) analysis and 3) formulation of recommendations. (See Figure 3.) Assembling relevant data involved literature search and review, structured interviews with medical and administrative personnel from relevant agencies and railroads, analysis of FRA and NTSB accident and casualty reports, and

review of dispute resolution provisions of current labor agreements. In some cases, railroad representatives preferred to provide a written response to questions rather than participate in a phone interview. For one foreign medical standards program, a government official was not available to provide information and only limited information could be obtained from a translation of the relevant regulation.

The analysis phase involved identifying the gaps in existing U.S. railroad medical standards. The existing FRA medical standards program for vision and hearing was compared with programs of the other DOT modal administrations and with five foreign programs. Options for various aspects of a medical standards program were defined based on existing U.S. railroad industry practices and the examples provided by foreign programs and the other modes of transportation. This phase also included defining alternative medical standards program models and estimating the resource requirements for each. The final phase focused on drawing conclusions and formulating recommendations.

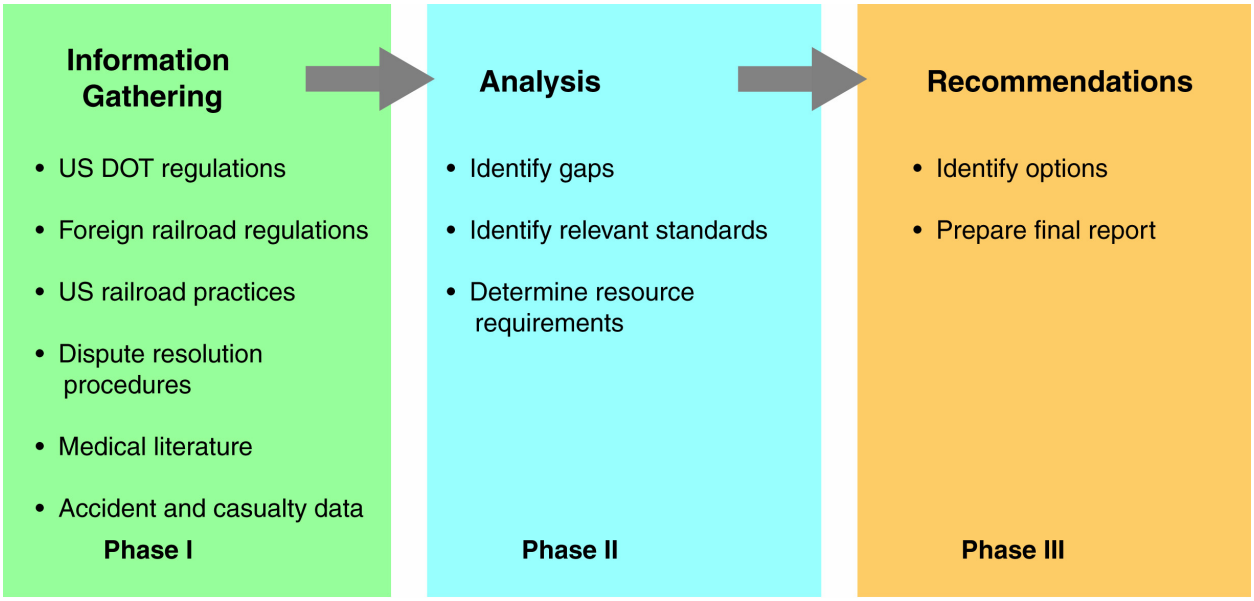

Figure 3. Overall approach

1.4 Scope

The focus of the investigation described in this report was primarily on the process for developing and implementing a medical standards program that seeks to identify employees with medical conditions that can lead to sudden incapacitation. A medical standards program is based on regulations that are further explained and supported by guidelines. While this effort gave some attention to the content and extent of medical criteria contained in the regulations and guidelines, the specific criteria were beyond the scope of this work. The study examined existing programs of three U.S. DOT modal administrations, five foreign rail organizations, and a total of 12 railroads representing Class 1, regional/short line and commuter operators. This program is intended to apply to railroad workers performing safety-sensitive functions. The FRA defines safety-sensitive functions in 49 C.F.R. § 209.303 as follows:

(a) Railroad employees who are assigned to perform service subject to the Hours of Service Act (45 U.S.C. 61-64b) during a duty tour, whether or not the person has performed or is currently performing such service, and any person who performs such service.

(b) Railroad employees or agents who:

(1) Inspect, install, repair, or maintain track and roadbed;

(2) Inspect, repair, or maintain, locomotives, passenger cars, and freight cars;

(3) Conduct training and testing of employees when the training or testing is required by the FRA's safety regulations; or

(c) Railroad managers, supervisors, or agents when they:

(1) Perform the safety-sensitive functions listed in paragraphs (a) and (b) of this section;

(2) Supervise and otherwise direct the performance of the safety-sensitive functions listed in paragraphs (a) and (b) of this section; or

(3) Are in a position to direct the commission of violations of any of the requirements of parts 213 through 236 of this title.

1.5 Organization of the Report

Chapters 2, 3, and 4 describe the medical standards programs of, respectively, the U.S. DOT modal administrations, foreign railroad agencies/organizations and U.S. railroads. A review of NTSB and FRA accident and casualty data is in Chapter 5. Chapter 6 presents the results of the medical literature review and Chapter 7 focuses on legal considerations. Chapter 8 describes options for the various components of a medical standards program and Chapter 9 contains the conclusions and recommendations for next steps. Four appendices contain supporting material on NTSB recommendations with regard to medical standards programs, FMCSA's handling of vision and diabetes waivers, abstracts for medical literature review and relevant ADA court cases.